Evaluating the Effectiveness of Traditional Study Habits and Techniques on Advanced Placement History and Social Sciences Exam Performance in New York State

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INTRODUCTION

Many schools and students strive for academic success. The Advanced Placement (AP) History and Social Sciences (HSS) exams offer students an opportunity to demonstrate their knowledge of HSS and potentially earn college credit. Students who pass AP exams show colleges their dedication and willingness to tackle challenging coursework, positively impacting their chance of admission (The College Board, 2014). Students are responsible for studying, which is the process of devoting time and effort to acquiring knowledge, both inside and outside of the classroom. Studying, which includes various study habits and techniques, is a crucial student-driven factor that affects exam performance. Research evaluating the effectiveness of traditional study techniques and habits on AP HSS exams is crucial to benefiting students, educators, and the education system as a whole by identifying strengths and weaknesses.

LITERATURE REVIEW

The Science of Learning

Synaptic plasticity[1] is a fundamental aspect of learning and must be understood to understand learning. Owens and Tanner's (2017) depict the process of synaptic plasticity during the *Share* phase of the Think-Pair-Share[2] activity, in which students are discussing with others, showing how it's necessary for creating and retrieving memories. In their explanation, Owens and Tanner also explain the role of neurotransmitters in synaptic plasticity. Acetylcholine, dopamine, and glutamate are released during motivation and attention, which increases synaptic plasticity, while cortisol is

[1] Synaptic plasticity refers to the brain's ability to change and adapt in response to learning and experiences

[2] Teaching method where instructors ask a question, then students think to themselves before being instructed to discuss their response with a person sitting near them.

released during stress, which hinders synaptic plasticity (Owens and Tanner, 2017). These findings suggest that minimizing stress, supporting motivation, and interacting with material are scientifically beneficial study strategies.

Building on this finding, understanding the importance of working memory in developing semantic memory is important in understanding the effectiveness of a study technique. Semantic memory is long-term memory for ideas, concepts, and facts. Guy and Bryne (2014) show that active learning techniques, which involve genuinely understanding a subject by interacting with the information, support the organization and retrieval of information in the semantic memory by keeping information in the working memory. Additionally, reducing mind-wandering and distractions can increase learning since the default mode of brain activity[3] has a relationship with decreased attention. Furthermore, metacognition was also found to be necessary to support effective learning, indicating that internal reflection is necessary to support learning (Guy and Bryne, 2014). These findings scientifically establish active learning as an effective study technique.

Exam Preparation Strategies

Understanding the relationship between the study habits that students use and their levels of academic success is important for identifying effective habits. According to Appelrouth et al. (2017), students who tend to study regularly, attend class, and self-reflect on their strengths and weaknesses tend to increase SAT scores. Additionally, students who begin their preparation early, spread out their study sessions, and take frequent practice tests tend to significantly increase their SAT scores

[3] A default network of brain regions where processing may become suspended during task-related action

(Appelrouth et al., 2017). Appelrouth et al. established the “time on task”[4] principle as an effective study habit for students.

Furthermore, Abaidoo (2018) found that in junior high school, maintaining consistent studying habits such as being on time, attending class, hard work, and intrinsic motivation led to success. Additionally, teachers who gave out frequent feedback to students about their academic performance and adjusted their lessons to their needs tended to support students in achieving academic success (Abaidoo, 2018). These findings reinforce the effectiveness of “time on task” and suggest that both students and educators are responsible for achieving success.

Building on self-reflection, Davis (2013) shows that the results of self-assessment quizzes[5] allow freshman college students to understand their strengths, weaknesses, and effectiveness of their learning style, which allows them to make changes to ensure effective learning, which leads to improved performance on high-stakes exams (Davis, 2013). This finding suggests that consistent self-reflection can be an effective study habit, allowing students to understand their strengths and weaknesses.

Students are fairly accurate in their self-awareness of their academic situation. Ober et al.'s (2022) study found a moderate correlation between the predicted AP exam scores of AP Statistics students and their actual scores (Ober et al., 2022). This finding reinforces the importance of self-reflection, as students are capable of understanding their preparedness level.

Early preparation continues to be an effective study habit, affecting exam performance. Devine-Eller (2012) shows that students who begin their preparation for college entrance exams like

[4] "Time on task" refers to the amount of time students dedicate to studying and preparing for their exams, with an emphasis on early preparation and consistent effort.

[5] Self-assessment quizzes are short assessments designed for students to test their own understanding and identify areas for improvement.

the SAT in 11th grade or earlier, about one year and above before taking the exam, tend to perform better. Devine-Eller mentions that exam preparation is time-sensitive, meaning it tends to change over time, which means that students tend to increase their preparation the closer the exam approaches (Devine-Eller, 2012). These findings reinforce the effectiveness of early exam preparation with some consistency as a study habit.

Study techniques used to learn in preparation for exams are just as important as habits. Hong et al. (2016) showed that active cognitive learning techniques in algebra, such as review, problem solving, fact-checking, and writing out thoughts, were associated with increased scores. The study also emphasizes that students should be more aware of the effectiveness of their learning techniques, with both students and educators responsible for doing so (Hong et al., 2016). Although focused on mathematics, these findings suggest that incorporating problem solving, checking answers, and externalizing information can be effective while studying.

Access to resources can significantly impact the studying techniques that a student uses, which can impact the quality of learning. Buchmann et al. (2010) show that while affordable options such as books and online materials can be helpful, more expensive resources like private courses or tutoring lead to improved scores, putting privileged students at an advantage (Buchmann et al., 2021). Building upon the effectiveness of tutoring, Elderkin (2023) shows that students who receive personalized, assessment-driven coaching[6] tend to perform better on college entrance exams like the SAT and ACT (Elderkin, 2023). These findings suggest that the study resources that a student uses may limit their ability to perform well, with tutoring or coaching being more effective than other traditional resources.

[6] Personalized, assessment-driven coaching prioritizes targeted instruction based on individual needs and uses frequent assessment to monitor progress and guide improvement.

Intrinsic Motivation

Although intrinsic motivation is not a study habit or technique, research shows that it has a massive influence on both, making it appropriate to mention it. Moneta and Spada (2009) show that students who are intrinsically motivated, meaning they are driven by personal interest, tend to use active learning techniques, which lead to increased success, while students who are extrinsically motivated, relying on external rewards, tend to procrastinate and use passive learning techniques, in which students receive information and reflect internally without further reflection (Moneta and Spada, 2009). Neigal et al. (2017) build upon this research by showing that students with a "need for cognition"[7] tend to perform better on the SAT and ACT and have higher cognitive engagement[8] (Neigal et al., 2017). These findings suggest that students who have a genuine interest in doing well in a subject tend to participate in active learning, leading to improved scores.

Other Influences on Exam Preparation and Performance

Stefansdottir et al. (2021) show that consistent sleep schedules that consisted of early and long sleep were positively correlated with improved standardized exam scores in 15-year-old adolescent students (Stefansdottir et al., 2021). This finding suggests that students should get an adequate amount of sleep to support learning.

In addition to sleep, Islam et al. (2021) show that cultural values emphasizing a strong work ethic and dedication to education can also support student motivation and preparation for challenging exams (Islam et al., 2021).

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[7] "Need for cognition" refers to an individual's intrinsic enjoyment and motivation for engaging in complex problem-solving and academic challenges.

[8] Cognitive engagement refers to a student's active mental involvement and effort invested in the learning process.

Gap in the Research and Research Goals

There is a significant gap in understanding the effectiveness of traditional study habits and techniques that affect Advanced Placement History and Social Sciences exam scores, especially in New York State. This is evident in the review of the existing literature, in which most research focused on college entrance exams like the SAT and ACT. Most of the traditional studying techniques and habits mentioned in the literature review are generalized to be effective for AP HSS exams, but this isn't always true, especially with the different exam formats. The focus on New York State narrows this gap further while ensuring a feasible scope for this study. The goal is to provide recommendations to both students and educators on research-supported studying techniques in History and Social Science courses, with this question guiding the research: To what extent do traditional study habits and techniques influence student performance on AP History and Social Sciences exams in New York State?

METHODOLOGY

The method was designed to analyze the effectiveness of traditional study habits and techniques used by students in New York State preparing for AP HSS exams. A quantitative survey, including traditional studying techniques and habits established in the existing literature, was chosen to gather data directly from students. Surveys are a useful and legitimate approach to research that has clear benefits, such as allowing for large distributions and large representative samples to investigate certain variables, with several strategies existing to reduce the potential for error and biases (Ponto, 2015). Additionally, quantifiable data is objective, meaning it is not influenced by personal feelings, strengthening the results of this research.

Figure 1: Survey Method for Investigating AP History and Social Science Exam Preparation

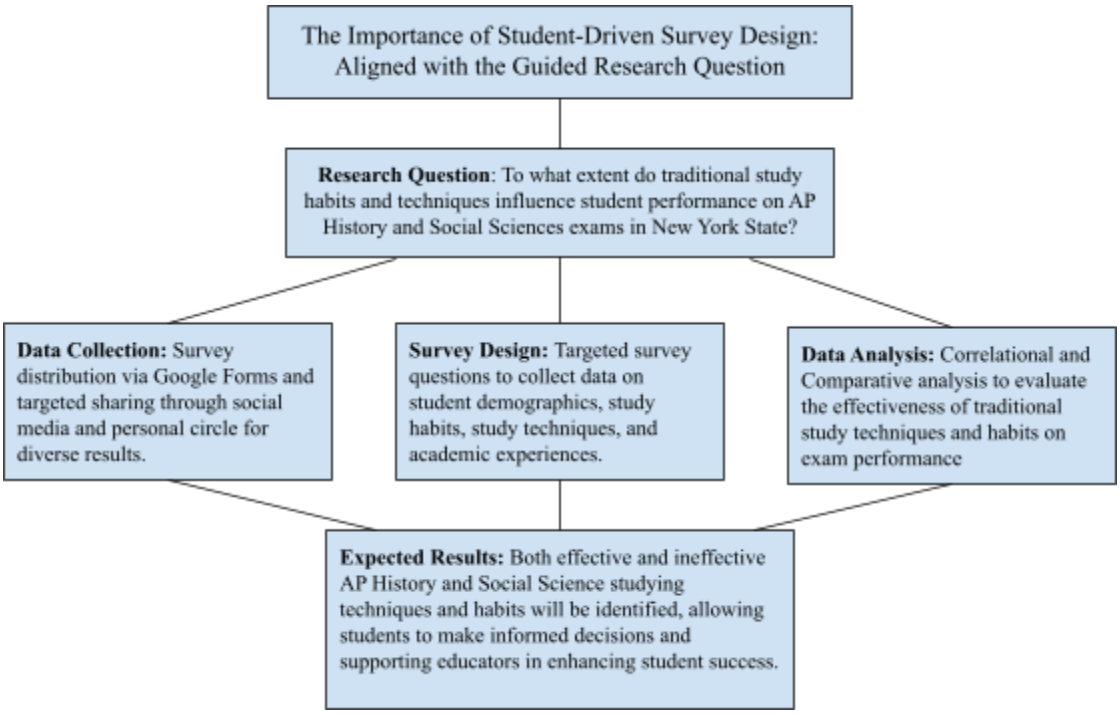

The Importance of Student-Driven Survey Design: Aligned with the Guided Research Question
Research Question: To what extent do traditional study habits and techniques influence student performance on AP History and Social Sciences exams in New York State?
Data Collection: Survey distribution via Google Forms and targeted sharing through social media and personal circle for diverse results.
Survey Design: Targeted survey questions to collect data on student demographics, study habits, study techniques, and academic experiences.
Data Analysis: Correlational and Comparative analysis to evaluate the effectiveness of traditional study techniques and habits on exam performance
Expected Results: Both effective and ineffective AP History and Social Science studying techniques and habits will be identified, allowing students to make informed decisions and supporting educators in enhancing student success.

Figure 1 shows a simplified visual representation of the alignment of the research question with the chosen methodology to effectively provide these results.

Subjects

The subjects for this study were students who have taken a minimum of one AP HSS exam and reside in New York State. Demographic data was only collected to ensure that this study received a diverse, representative sample of many different students. This study was not limited to high school students and allowed graduates to participate as long as they met the requirements to ensure a diversity of results.

Survey Design

A quantitative survey through Google Forms was designed to create a basis for correlational and comparative analysis. The survey collected data on student demographics, study habits, study

techniques, and exam experience. For a complete list of the questions discussed in this section, please refer to Appendix B. The multiple-choice, Likert-scale, and select-all-that-apply nature of the questions were used to gather quantitative data necessary to reveal possible correlations and create a basis for comparative analysis. Students were provided with an Other option where they could type in a response not shown to ensure all potential methods were represented.

Demographics

The survey collected basic demographic data, including age, gender identity, grade level, and high school grade point average (GPA). This data was only collected to ensure a diverse and representative sample, with no interest in further analysis due to the scope of this study.

Study Habits

The Study Habits section was designed to gather data on traditional study behaviors used by students in preparation for their exams to allow for comparative analysis between high scorers and low scorers. Study habits are defined as repeated behaviors related to studying or learning. This survey used multiple-choice, select-all-that-apply, and Likert-scale questions to capture quantitative data on specific behaviors, procrastination, motivation, and mental health. Because of the significant influence of mental health and intrinsic motivation on study habits, these factors were chosen to be measured.

Study Techniques

The Study Techniques section was designed to gather data on traditional learning methods used by students during their studying for AP HSS exams to allow for comparative analysis between high scorers and low scorers. Study techniques are defined as the method used for learning or studying. In addition, this section also gathered data on behaviors related to studying, such as

listening to music. Likert-scale and select-all-that-apply questions were used to gather a wide range of techniques, acknowledging that students may use multiple study techniques.

Exam Experience

The Exam Experience section was designed to gather data on the student's preparedness level before taking the exam and their actual AP exam score. This quantitative data was collected to measure exam performance and differentiate between the scorers while being objective. Data on student preparedness level was gathered to evaluate the self-awareness ability of students.

Data Collection

This survey was designed through Google Forms, an online survey platform that allows for quick and easy distribution through the internet. Failed cooperation among New York high schools to distribute this survey led to an alternative method of distribution. This survey was distributed via social media platforms such as TikTok, Instagram, Reddit, Discord, and Facebook, targeting discussion groups that include AP HSS students. There was a disclaimer to ensure participation was restricted to students in New York State. Social media has a very large audience of teenagers and has allowed this study to expand its reach from the bottom up.

Data Analysis

The collected data will be processed before analysis. The data will be organized in a Microsoft Excel spreadsheet, and results that are text will be coded into numbers to prepare for correlational analysis. Correlational analysis accompanied by scatterplots will be the primary method to evaluate Likert-scale questions, while comparative analysis will be used to evaluate select-all-that-apply questions.

Figure 2: Performance Group Criteria for Average AP History and Social Science Exam Scores

Performance Group	Average AP Exam Score Range
Low Scorer	1.0 - 2.4
Average Scorer	2.5 - 3.9
High Scorer	4.0 - 5.0

Additionally, to objectively evaluate the performance of students, their average AP HSS exam score will be calculated since HSS is treated as a broad category. This average score will be used for correlational analysis. For comparative analysis, students' will be placed into a performance group following the criteria depicted in Figure 2. Descriptive statistics will be used for comparative analysis between performance groups.

Ethical Considerations

This study followed all of the ethical principles before proceeding. Participants were given a detailed consent form, shown in Appendix A, which explained their rights in this study. Participation was voluntary, informed consent was required, and the right to withdraw without consequences was provided. The data of participants who were not eligible was deleted. To ensure confidentiality and prevent possible biases, no personally identifiable information was collected, and all of the results are reported in aggregate, guaranteeing anonymity. Each participant was also assigned a unique study code during analysis in Microsoft Excel to add another layer of security. Formal approval from the [redacted] Institutional Review Board was obtained prior to data collection.

RESULTS

Demographics

This study received a sample size of 309 students across New York State. Participants were mostly in the 11th and 12th grades of high school (64.7%), with the majority between the ages of 16 and 17 (67.9%). Most students reported a GPA of 3.0–3.6 (46%). There was a slight majority of male respondents (57.9%). Appendix C provides a table depicting this distribution. Other than the slight majorities, this study was successful in achieving a diversity of results.

Exam Distribution

Table 1: AP History and Social Science Exam Distribution Among Survey Respondents (n=309)

Course	Count (n)	Percentage (%)
Comparative Government and Politics	16	5.2%
European History	61	19.7%
Human Geography	189	61.2%
Macroeconomics	39	12.6%
Microeconomics	16	5.2%
Psychology	99	32%
United States Government and Politics	38	12.3%
United States History	131	42.4%
World History: Modern	117	37.9%

Table 1 shows the exam distributions among the sample of 309 students. Human Geography (61.2%), US History (42.4%), World History: Modern (37.9%), and Psychology (32%) were the most popular exams taken. On the other hand, Comparative Government and Politics (5.2%) and Microeconomics (5.2%) were the least popular exams taken. This may be due to availability in

schools or student preparedness levels. Regardless, all of the AP HSS exams were represented to some extent.

Study Environment

Table 2: Preferred Study Environments for AP History & Social Science Exam Preparation (n=309)

Study Location	Count (n)	Percentage (%)
Library	50	16.2%
Coffee Shop	11	3.6%
Classroom	45	14.6%
Outdoors	48	15.5%
Home	89	28.8%
Book Store	11	3.5%
Student Lounge	13	4.2%
Office Space	24	7.8%
The Park	18	5.8%

The distribution of the preferred study environments among the sample of 309 is shown in Table 2. Most students prefer their Home for studying (28.8%), followed by Libraries (16.2%) and Outdoors (15.5%). Other than these outliers, the distribution of these environments shows variety, which suggests learning environments are individualized and does not warrant further comparison between performance groups.

Comparative Analysis

Performance Distribution

Table 3: Distribution of Survey Respondents by Average AP Exam Score Group (n=309)

Performance Group	Average AP Exam Score Range (Criteria)	Count (n)	Percentage (%)

Low Scorers	1.0 - 2.4	70	22.7%
Average Scorers	2.5 - 3.9	187	60.5%
High Scorers	4.0 - 5.0	52	16.8%

The sample size of 309 students was assigned into a performance group for comparative analysis based on their average AP HSS exam score, with the distribution shown in Table 3. Most students were Average Scorers (60.5%), followed by Low Scorers (22.7%) and High Scorers (16.8%). Despite the uneven distribution, these performance groups can still provide valuable results in comparison to each other.

Study Resources

Table 4: Study Resources Used by AP History & Social Science Students

Study Resource	**Low Scorers (n=70)**	**Average Scorers (n=187)**	**High Scorers (n=52)**	**All Students (n=309)**
Books	19 (27.1%)	26 (13.9%)	32 (61.5%)	77 (24.9%)
Flashcards	22 (31.4%)	47 (25.1%)	34 (65.4%)	103 (33.3%)
Class Notes	58 (82.9%)	138 (73.8%)	47 (90.4%)	243 (78.6%)
Digital Resources	37 (52.9%)	98 (52.4%)	44 (84.6%)	179 (57.9%)
Videos	62 (89%)	147 (78.6%)	45 (86.5%)	254 (82.2%)
Study Guides	33 (47.1%)	129 (69%)	41 (78.8%)	203 (65.7%)
Podcasts	7 (10%)	32 (17.1%)	9 (17.3%)	48 (15.5%)
Academic Journals	3 (4.3%)	7 (3.7%)	12 (23.1%)	22 (7.1%)
Interactive Games	9 (12.9%)	14 (7.5%)	6 (11.5%)	29 (9.4%)

The distribution of the resources used while studying among the performance groups and the total sample of 309 students is shown in Table 4, with percentages corresponding to the column. Most students used their Class Notes (78.6%) and Videos (82.2%) as resources to prepare for AP HSS

exams. Higher Scorers were more likely to use resources such as Books (61.5%), Digital Resources (84.6%), Study Guides (78.8%), and Flashcards (65.4%). These findings suggest a relationship between these resources and high exam performance. The low number of responses for Podcasts (15.5%), Academic Journals (7.1%), and Interactive Games (9.4%) limit the ability to draw conclusions about their effectiveness.

Study Habits

Table 5: Study Habits Used by AP History & Social Science Students

Study Habit	Low Scorers (n=70)	Average Scorers (n=187)	High Scorers (n=52)	All Students (n=309)
Organized Study Schedule	9 (12.9%)	37 (19.8%)	18 (34.6%)	64 (20.7%)
Paying Attention in Class	53 (75.7%)	159 (85%)	39 (75%)	251 (81.2%)
Regular Review	29 (41.4%)	76 (40.6%)	33 (63.5%)	138 (44.7%)
Seeking Help when Needed	23 (32.9%)	61 (32.6%)	22 (42.3%)	106 (34.3%)
Practice Exams	18 (25.7%)	40 (21.4%)	21 (40.4%)	79 (25.6%)
Setting Study Goals	19 (27.1%)	45 (24%)	19 (36.5%)	83 (26.9%)
Rewarding Academic Goals	26 (37.1%)	64 (34.2%)	24 (46.2%)	114 (36.9%)
Creating Study Materials	13 (18.6%)	47 (25.1%)	12 (23.1%)	72 (23.3%)
Distraction-Free Studying	20 (28.6%)	76 (40.6%)	30 (57.7%)	126 (40.8%)
Coaching or Tutoring	11 (15.7%)	19 (10.2%)	6 (11.5%)	36 (11.7%)

The distribution of traditional study habit usage among the performance groups and the total sample of 309 students is shown in Table 5, with percentages corresponding to the column. Most students among all performance groups tend to Pay Attention in Class (81.2%) as a study habit. However, High Scorers tend to Set Study Goals (36.5%), Reward Academic Goals (46.2%), Maintain Organized Study Schedules (34.6%), prioritize Distraction-Free Studying (57.7%), Seek Help When Needed (42.3%), and take Practice Exams (40.4%) more than the other groups, suggesting the benefits to AP HSS exam performance of adopting these habits. Interestingly, there was a low number of students who used Coaching or Tutoring (11.7%), which questions its necessity for achieving academic success.

Study Techniques

Table 6: Study Techniques Used by AP History & Social Science Students

Study Technique	**Low Scorers (n=70)**	**Average Scorers (n=187)**	**High Scorers (n=52)**	**All Students (n=309)**
Cramming	57 (81.4%)	159 (85%)	30 (57.7%)	246 (79.6%)
Rereading Notes	45 (64.3%)	134 (71.7%)	34 (65.4%)	213 (68.9%)
Mnemonics	9 (12.9%)	25 (13.4%)	12 (23.1%)	46 (14.9%)
Active Recall	6 (8.6%)	27 (14.4%)	33 (63.5%)	66 (21.4%)
Rewriting Notes	8 (11.4%)	46 (24.6%)	27 (51.9%)	81 (26.2%)
Teaching Others	4 (5.7%)	21 (11.2%)	18 (34.6%)	43 (13.9%)
Self Explanation	7 (10%)	35 (18.7%)	25 (48.1%)	68 (22%)
Mind Mapping	3 (4.3%)	24 (12.8%)	19 (36.5%)	46 (14.9%)
Retrieval Practice	9 (12.9%)	44 (23.5%)	29 (55.8%)	82 (26.5%)

The distribution of the traditional study technique usage among the performance groups and the total sample of 309 students is shown in Table 6, with percentages corresponding to the column.

An interesting trend was found among Low Scorers. Low Scorers rely on passive study techniques such as Cramming (81.4%) and Rereading Notes (64.3%), suggesting a failure of these techniques in gaining a deep understanding. On the other hand, High Scorers rely on active learning techniques such as Active Recall (63.5%), Retrieval Practice (55.8%), Self-Explanation (48.1%), Rewriting Notes (51.9%), Teaching Others (34.6%), and Mind Mapping (36.5%), suggesting the benefits of active learning techniques on AP HSS exam performance.

Correlational Analysis

Microsoft Excel was used to conduct a two-tailed correlational analysis of the data achieved by the Likert-scale questions to reveal possible relationships between exam preparation methods and exam performance. Pearson's correlation coefficient (r) was calculated to measure the strength and direction of relationships. An r value closer to -1 or 1 depicts a strong relationship, while a value closer to 0 shows a weak relationship. The coefficient of determination value was also calculated to measure the percentage of variability within the values that can be explained by the regression model. The probability value (p) was also calculated with a value less than 0.05 allowing us to reject the null hypothesis which claims there is no relationship.

Academic Behaviors and AP Exam Performance

Table 7: Relationship Between Academic Behaviors and AP Exam Performance (n=309)

Variable 1 (x)	**Variable 2 (y)**	**Pearson Correlation Coefficient (r)**	**Coefficient of Determination (r^2)**	**Probability Value (p)**
Frequency of skipping class	Average AP Exam Score	-0.3852	0.14838	$p < 0.001$
Frequency of doing other activities while studying	Average AP Exam Score	-0.6242	0.38966	$p < 0.001$

Frequency of checking phone while studying	Average AP Exam Score	-0.3389	0.11484	$p < 0.001$
Frequency of listening to music while studying	Average AP Exam Score	-0.4285	0.00184	$p > 0.05$

Figure 3: Relationship Between Frequency of Skipping Class and Average AP Exam Score (n=309)

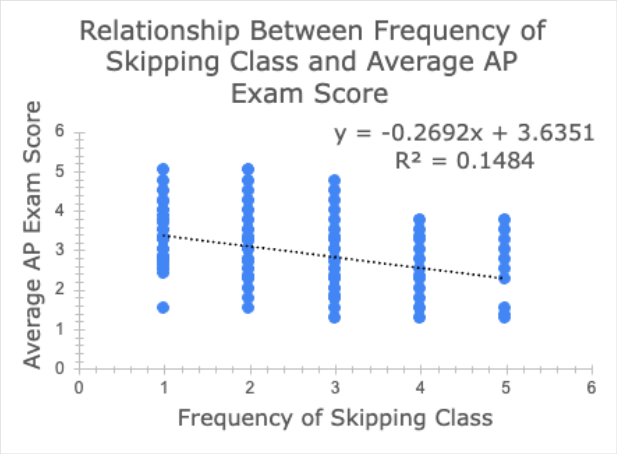
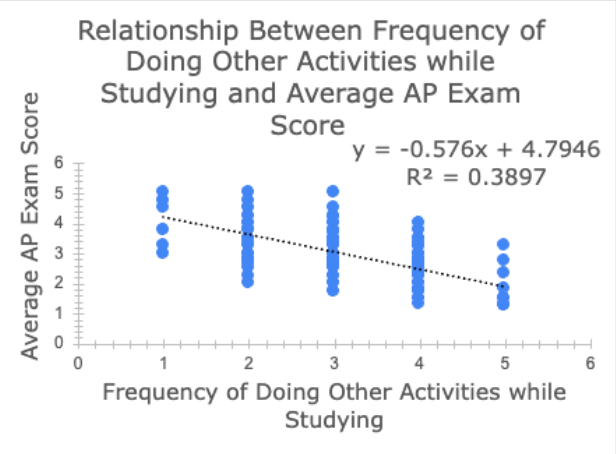


Figure 4: Relationship Between Frequency of Doing Other Activities while Studying and Average AP Exam Score (n=309)



There was a slightly negative correlation ($r = -0.3852$, $p < 0.001$) between Frequency of Skipping Class and Average AP HSS Exam Scores shown in Table 7 and Figure 3. This suggests that regularly attending class may contribute to improved exam scores, with about 15% of the variation in the exam scores possibly explained by this habit.

There was a moderately negative correlation ($r = -0.6242$, $p < 0.001$) between Doing Other Activities While Studying and Average AP HSS Exam Scores shown in Table 7 and Figure 4. This suggests that focused studying may lead to improved exam scores, with about 39% of the variation in exam scores possibly explained by this technique.

Figure 5: Relationship Between Frequency of Checking Phone while Studying and Average AP Exam Score (n=309)

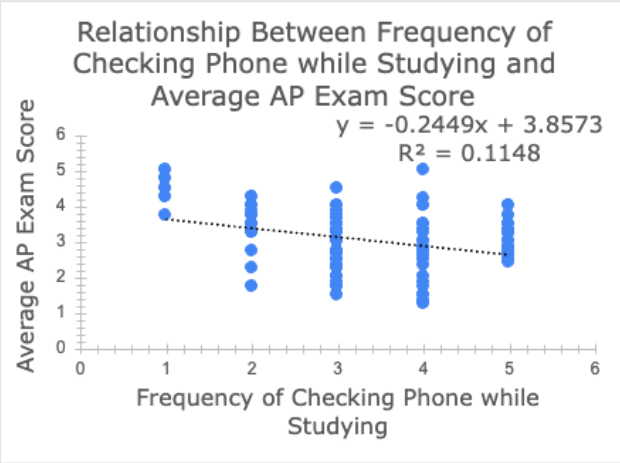
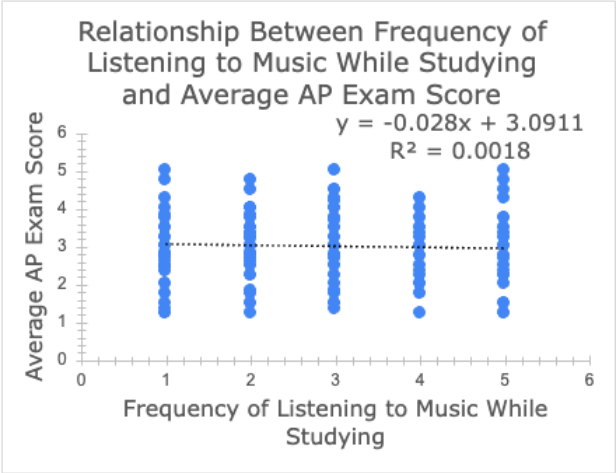

Relationship Between Frequency of Checking Phone while Studying and Average AP Exam Score
y = -0.2449x + 3.8573
R² = 0.1148
Average AP Exam Score
Frequency of Checking Phone while Studying

Figure 6: Relationship Between Frequency of Listening to Music while Studying and Average AP Exam Score (n=309)


Relationship Between Frequency of Listening to Music While Studying and Average AP Exam Score
y = -0.028x + 3.0911
R² = 0.0018
Average AP Exam Score
Frequency of Listening to Music While Studying

There was a slight negative correlation ($r = -0.3389$, $p < 0.001$) between the Frequency of Checking Phone While Studying and Average AP HSS Exam Scores shown in Table 7 and Figure 5. This suggests that decreasing phone distractions while studying might lead to improved exam scores, with 11.5% of the variation in exam scores possibly explained by this technique.

There was no correlation ($r = -0.04285$, $p > 0.05$) between the Frequency of Listening To Music While Studying and Average AP HSS Exam Scores shown in Table 7 and Figure 6. This suggests that listening to music while studying is individualized and depends on the student's preference, with no effect on average AP HSS exam scores.

Time Investment and AP Exam Performance

Table 8: Relationship Between Time Investment and AP Exam Performance (n=309)

Variable 1 (x)	Variable 2 (y)	Pearson Correlation Coefficient (r)	Coefficient of Determination (r^2)	Probability Value (p)
Days Studied per Week	Average AP Exam Score	0.6007	0.36087	$p < 0.001$

Daily Hours Studying	Average AP Exam Score	-0.2872	0.08249	$p < 0.001$
Weeks Before AP Exam Students Begin Preparation	Average AP Exam Score	0.6896	0.47552	$p < 0.001$

Figure 7: Relationship Between Days Studied per Week and Average AP Exam Score (n=309)

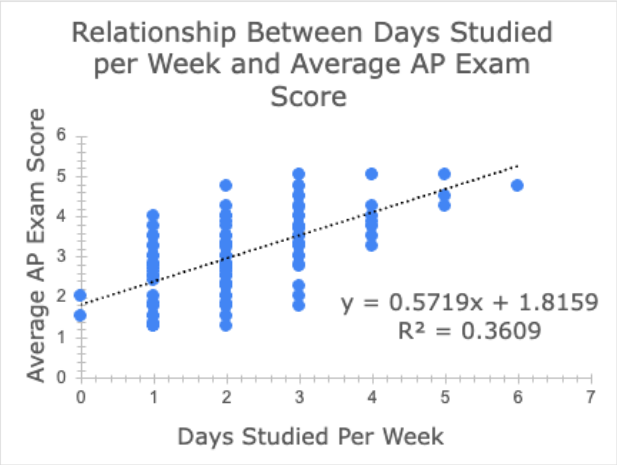
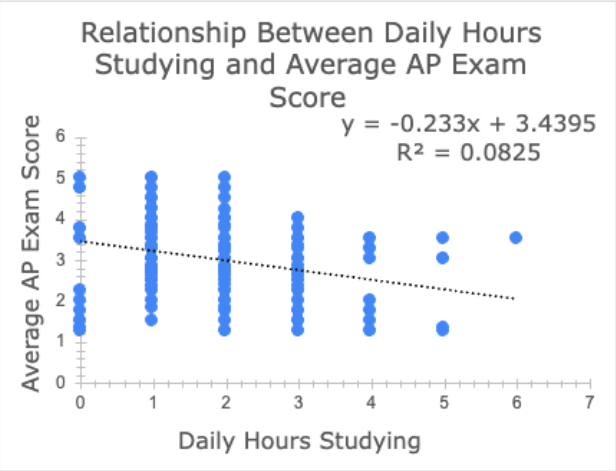

Relationship Between Days Studied per Week and Average AP Exam Score
Average AP Exam Score
Days Studied Per Week
y = 0.5719x + 1.8159
R² = 0.3609

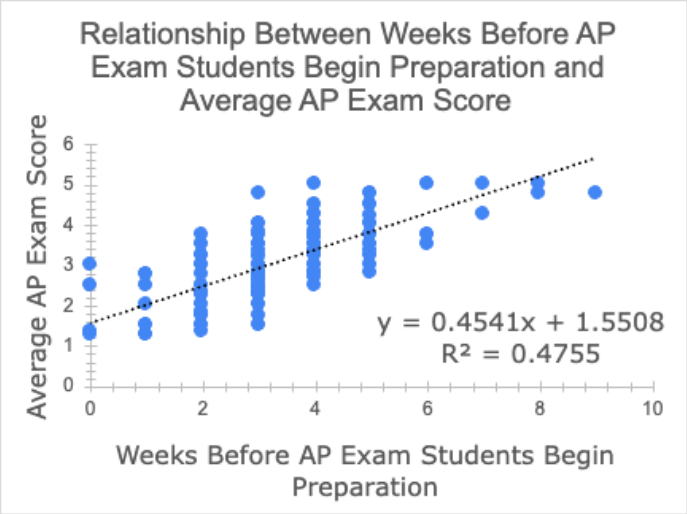
Figure 8: Relationship Between Daily Hours Studying and Average AP Exam Score (n=309)


Relationship Between Daily Hours Studying and Average AP Exam Score
Average AP Exam Score
Daily Hours Studying
y = -0.233x + 3.4395
R² = 0.0825

There was a moderately positive correlation ($r = 0.6007$, $p < 0.001$) between the Days Studied per Week and Average AP HSS Exam Scores shown in Table 8 and Figure 7. This suggests that consistently spreading out studying over time may contribute to improved AP HSS exam scores, with about 36% of the variation in exam scores possibly explained by this habit.

There was a weak negative correlation ($r = -0.2872$, $p < 0.001$) between the Daily Hours Spent Studying and Average AP HSS Exam Scores shown in Table 8 and Figure 8. This suggests that long studying sessions may not improve AP HSS exam scores, with about 8% of the variation in exam scores possibly explained by the habit. This emphasizes the importance of spacing out studying over time.

Figure 9: Relationship Between Weeks Before AP Exam Students Begin Preparation and Average AP Exam Score (n=309)



There was a slightly strong positive correlation ($r = 0.6896$, $p < 0.001$) between the Weeks Before the AP HSS Exam that Students Began to Prepare and Average AP HSS Exam Scores, as shown in Table 8 and Figure 9. This suggests that beginning AP HSS exam preparation and review early may improve AP HSS exam scores, with about 48% of the variation in exam scores possibly explained by this habit.

External Factors and AP Exam Performance

Table 9: Relationship Between External Factors and AP Exam Performance (n=309)

Variable 1 (x)	Variable 2 (y)	Pearson Correlation Coefficient (r)	Coefficient of Determination (r^2)	Probability Value (p)
Mental Health Rating	Average AP Exam Score	0.6952	0.48331	$p < 0.001$
Intrinsic Motivation Level	Average AP Exam Score	0.6007	0.36081	$p < 0.001$
Procrastination Frequency	Average AP Exam Score	-0.5095	0.25961	$p < 0.001$
Preparedness Level Before Exam	Average AP Exam Score	0.7136	0.50927	$p < 0.001$

Daily Hours of Sleep	Average AP Exam Score	0.2099	0.04406	$p < 0.001$

Figure 10: Relationship Between Mental Health Rating and Average AP Exam Score (n=309)

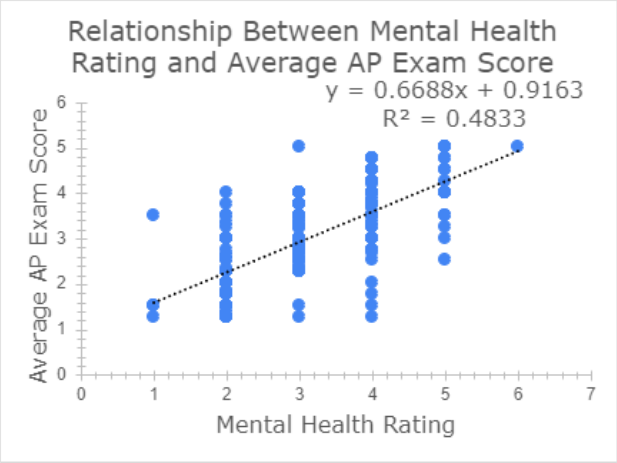
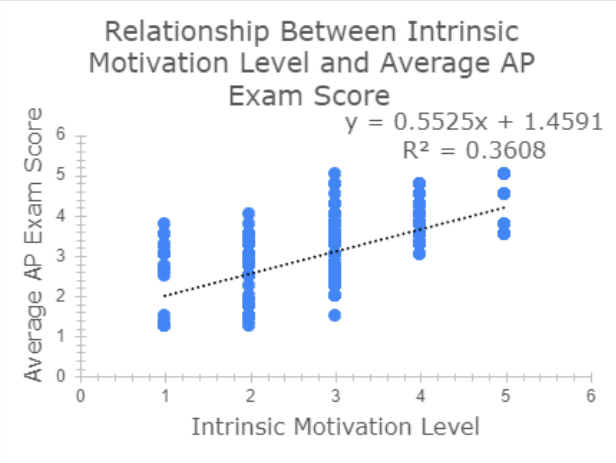


Figure 11: Relationship Between Intrinsic Motivation Level and Average AP Exam Score (n=309)



There was a strong positive correlation ($r = 0.6952$, $p < 0.001$) between students' Mental Health Ratings and Average AP HSS Exam Scores, as shown in Table 9 and Figure 10. This suggests that positive and healthy mental health may improve AP HSS exam scores, with about 48% of the variation in exam scores possibly explained by this factor.

There was a moderately positive correlation ($r = 0.6007$, $p < 0.001$) between students' Intrinsic Motivation Level and Average AP HSS Exam Scores, as shown in Table 9 and Figure 11. This suggests that personal motivation to genuinely do well may lead students to participate in active studying, which shows an improvement in AP HSS exam scores, with about 36% of the variation in exam scores possibly explained by this factor.

Figure 12: Relationship Between Procrastination Frequency and Average AP Exam Score (n=309)

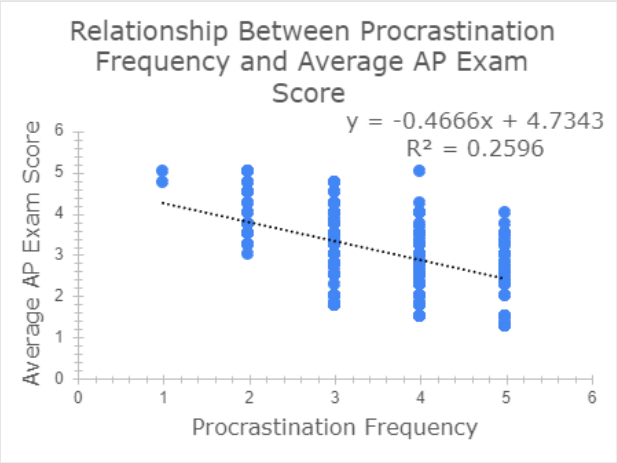
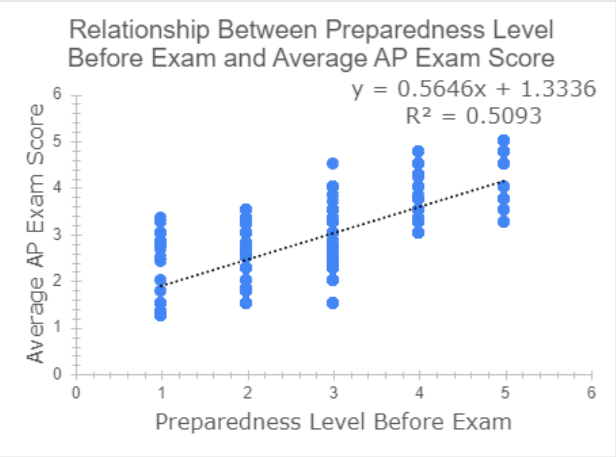


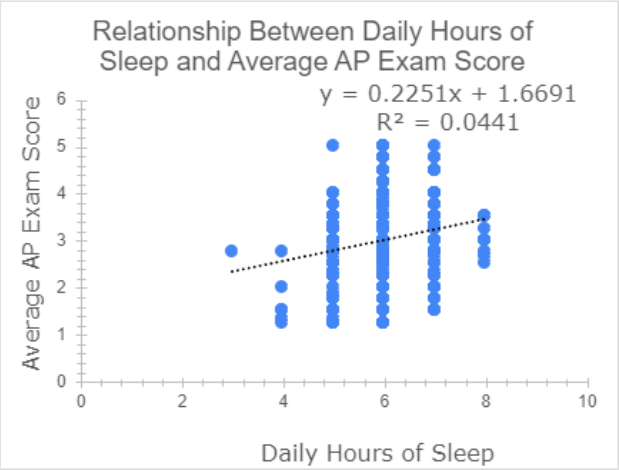
Figure 13: Relationship Between Preparedness Level Before Exam and Average AP Exam Score (n=309)



There was a moderate negative correlation ($r = -0.5095$, $p < 0.001$) between students' Procrastination Frequency and Average AP HSS Exam Scores, as shown in Table 9 and Figure 12. This suggests that procrastination, which includes delaying studying, may hinder exam preparation, which lowers AP HSS exam scores, with about 26% of the variation in exam scores possibly explained by this habit.

There was a strong positive correlation ($r = 0.7136$, $p < 0.001$) between the student's Preparedness Level Before Taking the AP HSS Exam and Average AP HSS Exam Scores shown in Table 9 and Figure 13. This suggests that students might be self-aware of the effectiveness of their preparedness level. About 51% of the variation in exam scores is possibly explained by this factor.

Figure 14: Relationship Between Daily Hours of Sleep and Average AP Exam Score (n=309)



There is a weak positive correlation ($r = 0.2099$, $p < 0.001$) between a student's Daily Hours of Sleep and Average AP HSS Exam Scores, as shown in Table 9 and Figure 14. This suggests that increasing hours of sleep may lead to improved AP HSS exam scores to some extent. About 4% of the variation in exam scores is possibly explained by this factor, suggesting that sleep may just be a requirement for learning to occur rather than significantly impacting exam performance.

Table 10: Student Perceptions of AP History & Social Science Education Quality (n=309)

Quality of Education Rating	Count (n)	Percentage (%)
1 - Low	24	7.8%
2 - Somewhat Low	38	12.3%
3 - Moderate	126	40.8%
4 - Somewhat High	72	23.3%
5 - High	49	15.8%

The distribution of the quality of education ratings among the total sample of 309 students is shown in Table 10. Most of the students reported that their quality of education is Moderate or above (79.9%), while the rest reported Somewhat Low to Low (20.1%). About 39.1% of students believe they have a High quality of education, which leaves room for improvement for the rest of the 60.9%

of students. The mostly positive view suggests that the education system is adequately preparing students for AP HSS exams, with room for improvement in keeping students engaged.

DISCUSSION AND ANALYSIS

The study was designed to evaluate the effectiveness of traditional studying techniques and habits used by students in AP HSS exams and make recommendations for improvement. The results were organized into the themes of time management, active learning, motivation, and external factors. This section will go into the implications of the results for students and educators in New York State while acknowledging the study's limitations.

Implications

Time Management

There were interesting results regarding the impact of time management habits on AP HSS exam performance. Students who frequently skip class, do other activities while studying, and procrastinate tend to do poorly on AP HSS exams, with negative correlations supporting this. This suggests regularly attending class, focusing while studying, and consistent studying are effective study habits. Additionally, students who spread out their studying across multiple days of the week tended to have high AP HSS exam scores, while students who spent long hours studying in a day had lower AP HSS exam scores. Another key factor that emerged was early preparation, with earlier exam preparation leading to higher exam scores.

The findings of this research are similar to the findings of Appelrouth et al.'s (2017) study, establishing the "time on task" principle, which states that early preparation leads to academic success (Appelrouth et al., 2015). Students must work on improving their time management with recommendations of organizing a study schedule, working on assignments daily to avoid

procrastination, and finding a study environment free from distractions. Educators can discourage procrastination through reasonable but strict deadlines.

Active Learning

The study successfully revealed the effectiveness of active learning techniques. Passive learning techniques such as cramming and rereading notes were more frequent with low and average scorers. These types of techniques support short-term memorization rather than deep understanding. On the other hand, high scorers relied on active learning techniques such as active recall, self-explanation, rewriting notes, teaching others, and mind mapping. These relationships support the effectiveness of active learning techniques while also showing the weakness of passive learning.

The findings of this research are similar to those of Hong et al. (2006), who emphasized the importance of active cognitive learning techniques in algebra (Hong et al., 2006), and Guy and Bryne (2014), who explained the effectiveness of active learning in creating semantic memories (Guy and Byrne, 2014). Students need to adjust their study techniques to active learning to ensure that they can successfully maintain and retrieve information. Educators need to ensure that their students are aware of active learning, helping them find a technique that works best for them.

Focus and Motivation

This study showed the impact of focus and motivation on AP HSS exam performance. Students who were frequently distracted by their phones tended to receive lower scores on AP HSS exams, which suggests maintaining focus as a beneficial factor. Additionally, students who reported high levels of intrinsic motivation and mental health were more likely to receive higher scores on the AP HSS exams, which suggests the importance of genuinely wanting to do well and a positive mindset on exam performance. There was no relationship between studying environments or

listening to music and AP HSS exam performance, suggesting that students have preferences that can either enhance or hinder their focus while studying.

These findings are similar to the findings of Moneta and Spada's (2009) study, where they found a relationship between intrinsic motivation and deep learning (Moneta and Spada, 2009). Neigel et al.'s (2017) study also emphasizes the importance of focused studying without distractions (Neigel et al., 2017), while Owens and Tanner's (2017) study reveals the negative impacts of stress on memory formation (Owens and Tanner, 2017). These studies suggest that students should limit their distractions and create intrinsic motivation by connecting their course material to real-world situations or choosing to take classes that they are genuinely interested in. Educators should make learning HSS fun and interactive to maintain motivation.

External Factors

The study evaluated external factors that could possibly influence AP HSS exam preparation. An interesting result found was that students did fairly well in self-evaluating themselves and their academic situation, with a strong relationship between their perceived preparedness level before the exam and their AP exam score. Additionally, sleep had a slightly positive correlation but did not significantly impact AP exam performance. The majority of students rated their education quality as moderate to high, which shows a positive view of the effort of their educational systems. Some resources revealed themselves as effective among high scorers, such as books, digital resources, study guides, and flashcards. However, these resources were consistently high among the rest of the groups, which suggests that resources do not solely improve AP HSS exam performance.

These findings are similar to the research of Davis (2013), who emphasized the importance of self-assessment quizzes on exam performance since they allowed students to find areas for

improvement and weaknesses (Davis, 2013). Stefansdottir et al.'s (2021) study supports the slight correlation of hours of sleep on academic performance (Stefansdottir et al., 2021). These findings suggest that students should take advantage of their self-awareness by identifying and improving their weaknesses. Educators should give students the opportunity to consistently evaluate their learning techniques by incorporating self-reflection quizzes after unit exams. Students should maintain consistent sleep schedules to support learning and try out multiple different study resources to find one that works best for them.

Limitations

Sample Characteristics and Representativeness

The distribution of the survey and sample size may have limited the representativeness of the results. By distributing across social media, this does not represent students who don't use social media or have internet access, which means their data was not collected. Additionally, this survey was also distributed across my high school, which may have skewed the sample towards students attending this school. Finally, these results are only representative of students in New York State, not all students.

Self-Reported Data and Potential Biases

The quantitative survey used in this study heavily relied on students self-reporting their studying techniques and habits, which may have led to inaccuracies and biases. Students might unintentionally misremember their studying since they are reflecting on exams taken more than a year ago. Students might intentionally or unintentionally overestimate or underestimate their exam preparation, and they always have the ability to just lie about their responses. Social desirability may

have occurred, in which students might have been pressured to present a positive image of themselves.

Methodology

This study evaluated studying techniques and habits at a certain point in time, almost a year after taking an exam, which may have caused students to misremember their exam preparation. Most researchers agree that studying is time-sensitive, so the results gained may not be consistent throughout the entire school year. Additionally, quantitative data was collected to capture objective data, but the multiple-choice and Likert-scale options were limited, which possibly hid certain exam preparation strategies.

Interpreting Findings and Scope of the Study

The focus of this study was to find relationships and correlations, but this does not mean causation, meaning the results of this study are not definitive. Additionally, the narrow scope of the study did not acknowledge other external factors such as economic situation, teaching methods, or parental involvement, which could also influence exam performance. Finally, the study failed to differentiate between specific AP HSS courses or between history and social sciences, treating them as a general category.

Fulfillment of Gap in Research

While extensive research exists on preparation techniques for standardized tests like the SAT and ACT, there has been limited focus on evaluating the effectiveness of these traditional techniques in preparation for AP HSS exams. This study successfully addresses this gap in knowledge by evaluating the effectiveness of traditional study techniques and habits among AP HSS students in New York State. This research has expanded our understanding of effective preparation strategies

and how they might vary across exams. This research built upon the findings found in the existing literature and examined their effectiveness in AP HSS courses for students in New York State, creating a basis for further research on this subject.

AREAS FOR FUTURE RESEARCH

Sample Expansion and Representation

The representativeness of these results can be expanded through further research. The sample size of 309 students is small compared to the hundreds of thousands of students in New York State. Further studies can distribute their survey to larger audiences through cooperation among school districts within New York State, which will include all students, to reinforce the accuracy and representativeness of these results.

Longitudinal Studies

Researchers with more time should focus on a longitudinal study design, which would survey students throughout the school year at fixed intervals, right when exam preparation is fresh in their minds, to understand how their study habits and techniques change over time and prevent misremembering. This research can go more in depth in understanding certain time periods where studying increases.

Methodological Enhancements

The method of this study was a survey, which limited the response options of students and created potential biases through self-reported data. Further research can benefit from a mixed-method approach combining both quantitative and qualitative methods. Interviews can be conducted, and qualitative options such as short responses can be added to the survey to successfully understand the full range of techniques that students use in preparation. Researchers can frame the

questions appropriately and ensure confidentiality to prevent biases. The only method that can prove a cause-and-effect relationship is an experiment, which is an option for further research if the resources are available.

Expanding the Scope of the Study

The scope of this study was very broad. Future research can build upon these findings and expand the scope of the study by differentiating between several AP HSS subjects to reveal differences in preparation between them. Future research can benefit from acknowledging other external factors, such as economic background, parental involvement, and life situation, that can impact exam preparation but were unmeasured in this study. Finally, this sample of this study can be expanded across the entire United States or internationally to expand the representativeness of these results to all students.

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Appendix A:

AP History and Social Sciences Exam Preparation Survey Consent Form

Evaluating the Effectiveness of Various Study Habits and Techniques on AP History and Social Sciences Exam Performance in New York State

This study is designed to investigate the relationship between study habits, techniques, and their effects on performance in CollegeBoard's Advanced Placement History and Social Sciences exams among students in New York. By participating, you are contributing to an understanding of effective studying methods in AP HSS exams.

The survey is divided into four sections focusing on AP History and Social Sciences course experiences.

Demographics (Section 1): Questions regarding basic personal information**.**
Study Habits (Section 2): Questions regarding study habits and resources used in preparation.
Study Techniques (Section 3): Questions regarding study techniques used during preparation.
AP History and Social Sciences Exam Experience (Section 4): Questions regarding exam scores and preparedness level.

Total Estimated Completion Time: 4 - 8 minutes

Voluntary Participation

Participation is entirely voluntary. You can withdraw at any time, and responses are recorded only upon submission.

Confidentiality

Your responses will remain confidential. No personal identifying information will be kept. Data will be reported in aggregate, ensuring individual participants will not be identifiable.

Risks and Benefits

There are no long-term risks or direct benefits from participating in this study. Your responses will contribute to a greater understanding of the effects of preparation techniques on AP History and Social Sciences exams.

Response Submission and Editing Options
Online Submission: You must complete the survey online via Google Forms, which allows for post-submission edits until the due date. Online responses can be edited until March 25, 2024, 10:00 PM EST.

Contact Information
For any questions or concerns, please feel free to contact me, [redacted], at [redacted].org.

Voluntary Participation
Participation in this study is completely voluntary. If you decide not to participate there will not be any consequences. You are not obligated to answer a question if it makes you uncomfortable.

1.) Do you wish to participate?

( ) I agree to participate

( ) I do not agree to participate

Adult Informed Consent
By signing this form, I acknowledged that I have read and understand the information above and I freely give my consent/assent to participate in this study.

If you agree to participate, please provide your name or initials below. If this does not apply to you, please leave this blank.

Signature: _____

If you are under the age of 18 years, please review this section with your parents/guardians and sign below.

Minor Informed Consent
By signing this form, I acknowledge that I have read and understand the information above and I freely give permission for my child to participate.

If you agree to allow your child to participate, please provide your name or initials below. If this does not apply to you, please leave this blank.

Signature: _____

Appendix B:

AP History and Social Sciences Exam Preparation Survey

Demographics (Section 1)

This section gathers basic demographic information to better understand the background of our respondents. Your participation is entirely voluntary, and you have the right to withdraw from this survey at any point without any consequences.

<u>This survey is only focused on students residing in New York State. If you are not residing in New York, your response will not be included in the final analysis of this study. If this applies to you, feel free to stop responding to this survey at this point.</u>

1.) What is your age?
- ( ) 14 and under
- ( ) 15
- ( ) 16
- ( ) 17
- ( ) 18 and over

2.) What is your gender identity?
- ( ) Male
- ( ) Female
- ( ) Non-Binary
- ( ) Prefer not to say
- ( ) Other: _____

3.) What is your current or most recent educational level?
- ( ) Middle School (8th Grade and below)
- ( ) Freshman (9th Grade)
- ( ) Sophomore (10th Grade)
- ( ) Junior (11th Grade)
- ( ) Senior (12th Grade)
- ( ) High School Diploma or equivalent
- ( ) College/University Student
- ( ) Other: _____

4.) What is or was your unweighted high school GPA on a 4.0 scale?
( ) 3.7 - 4.0 (A- to A+, 90–100)
( ) 3.0 - 3.6 (B to B+, 84–89)
( ) 2.0 - 2.9 (C to B-, 74–83)
( ) 1.0 - 1.9 (D to C-, 64–73)
( ) Below 1.0 (D- and below, 0–63)
( ) Prefer not to say

Study Habits (Section 2)
This section gathers your study habits during preparation for AP History and Social Sciences exams. Understanding how you prepare for these exams is crucial for this research. Participation is voluntary, and you may withdraw at any time without any consequences.

This survey is focused specifically on students who have taken AP History or Social Sciences exams. If you have not taken any AP History or Social Sciences exams in the past, your response will not be included in the final analysis of this study. If this applies to you, please feel free to stop responding to this survey at this point.

5.) Please indicate which AP History and Social Sciences exams you have taken and the year you took them.
If you have not taken an exam in a particular subject, please leave that row blank.
(Place an 'X' in the appropriate columns)

AP Exam	2023	2022	2021	2020	2019	Earlier
Comparative Government and Politics						
European History						
Human Geography						
Macroeconomics						
Microeconomics						
Psychology						
United States Government and Politics						
United States History						

World History: Modern						

6.) What is your preferred physical study environment?

( ) Library
( ) Coffee Shops
( ) Classroom
( ) Outdoors
( ) Home
( ) Book Store
( ) Student Lounge
( ) Office Space
( ) The Park
( ) Other: _____

7.) On average, how many days per week do you study for your AP History and Social Sciences courses?

None 0 1 2 3 4 5 6 7 Daily

8.) On days that you study for AP History and Social Sciences courses, how many hours do you typically spend?

0 1 2 3 4 5 6 7 8 9 10

9.) How would you rate your mental health during the school year, on average? *(Optional)*

Negative 1 2 3 4 5 Positive

10.) How strongly are you motivated by personal goals to achieve the best possible academic results?

No Motivation 1 2 3 4 5 Very Motivated

11.) How often do you procrastinate when it comes to academics?

Never 1 2 3 4 5 Always

12.) How many hours of sleep on average do you get every night?

0 1 2 3 4 5 6 7 8 9 10

13.) Please rate the quality of AP History and Social Science education in your school.

Low Quality 1 2 3 4 5 High Quality

14.) How many weeks before the AP History and Social Science exams do you start reviewing?

0 1 2 3 4 5 6 7 8 9 10

15.) Please check all the statements that apply to you regarding your study habits: *(Select all that apply)*

[ ] I create a study schedule to manage my time effectively.
[ ] I pay attention in class to understand the material being taught.
[ ] I regularly review class materials to reinforce my learning.
[ ] I ask for assistance or guidance from teachers or peers when I need help understanding a topic.
[ ] I take practice exams to prepare for real exams and improve my performance.
[ ] I set specific, achievable goals for my study sessions.
[ ] I reward myself for reaching my academic goals.
[ ] I create and use study materials to help in memorization and understanding.
[ ] I ensure that I am free from distractions to maintain focus during study sessions.
[ ] I receive coaching or tutoring to enhance my understanding and performance.
[ ] Other: _____

Study Techniques (Section 3)

This section gathers your studying techniques while preparing AP History and Social Sciences exams. Understanding the techniques that you use is crucial to this research. Participation is voluntary, and you may withdraw at any time without any consequences.

16.) For the following statements, indicate how frequently you do each activity

(1) Never - Rarely - Sometimes - Often - Always (5)

a.) I listen to music while studying.

Never 1 2 3 4 5 Always

b.) I skip class for reasons that are not excused.

Never 1 2 3 4 5 Always

c.) I do other activities while studying.

Never 1 2 3 4 5 Always

d.) I check my phone while studying.

Never 1 2 3 4 5 Always

17.) Which of the following techniques do you use while studying? *(Select all that apply)*

[ ] Cramming
[ ] Rereading notes
[ ] Mnemonics
[ ] Active Recall
[ ] Rewriting Notes
[ ] Teaching Others
[ ] Self Explanation
[ ] Mind Mapping
[ ] Retrieval Practice
[ ] Other: _____

18.) Which of the following resources do you use while studying? *(Select all that apply)*

[ ] Books
[ ] Flashcards
[ ] Class Notes
[ ] Digital Resources
[ ] Videos
[ ] Study Guides
[ ] Podcasts
[ ] Academic Journals
[ ] Interactive Games

[ ] Other: _____

AP History and Social Sciences Exam Experience (Section 4)
This section gathers your personal experiences with AP History and Social Sciences exams. Understanding your perspective of exam difficulty, preparedness, and overall experience is crucial to this research. Participation is voluntary, and you may withdraw at any time without any consequences.
<u>If you have not taken an exam in a particular subject, please leave that row blank.</u>

19.) Overall, how prepared did you feel for the AP History and Social Sciences exams?

Unprepared 1 2 3 4 5 Prepared

20.) What score did you receive on the AP History and Social Sciences exams?
<u>(Place an 'X' in the appropriate columns)</u>

AP Exam	1	2	3	4	5
Comparative Government and Politics					
European History					
Human Geography					
Macroeconomics					
Microeconomics					
Psychology					
United States Government and Politics					
United States History					
World History: Modern					

Appendix C:

Demographics Section: Survey Distribution

Table C1: Demographics of Survey Respondents (n=309)

Age	**Count (n)**	**Percentage (%)**
14 and under	6	2%
15	34	11%
16	115	37.2%
17	95	30.7%
18 and over	59	19.1%
Gender	**Count (n)**	**Percentage (%)**
Female	105	34%
Male	179	57.9%
Non-Binary	8	2.6%
Prefer not to say	17	5.5%
Educational Level	**Count (n)**	**Percentage (%)**
Middle School (8th Grade and below)	2	0.7%
Freshman (9th Grade)	5	1.6%
Sophomore (10th Grade)	37	12%
Junior (11th Grade)	111	35.9%
Senior (12th Grade)	89	28.8%
High School Diploma	39	12.6%
College/University	26	8.4%
GPA Range	**Count (n)**	**Percentage (%)**
3.7 - 4.0	63	20.4%
3.0 - 3.6	142	46%

2.0 - 2.9	77	24.9%
1.0 - 1.9	12	3.9%
Below 1.0	4	1.3%
Prefer not to say	11	3.5%